

REMARKS

Claims 1-61 are pending; claims 2-25, 29, 31, 33-34, 41, 46-47, and 51 have been amended herein. No new matter is added.

I. THE RESTRICTION REQUIREMENT AS TO CLAIMS 1-58 AND 59-61
SHOULD BE WITHDRAWN

Reconsideration is respectfully requested of the restriction requirement and, in particular, of the reason stated in the Office action for the restriction requirement.

The basis for the restriction requirement on page 2 of the Office action dated September 23, 2004 is the following assertion:

- The inventions are distinct if it can be shown that either:
(1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. MPEP 806.05(e). In this case the composition as claimed can be used in another and materially different process other than PCB manufacture such as coating glass windshields for subsequent metallization for defogging.

This basis is incorrect because the composition of the Group I claims is specifically stated to be "for enhancing adhesion between a copper conducting layer and a dielectric material during manufacture of a printed circuit board." Accordingly, the product solution of the Group I claims 1-58 as claimed cannot be used in a materially different process from that of claims 59-61, such as coating glass windshields for subsequent metallization for defogging. Restriction of claims 1-58 and 59-61 into distinct groups based on MPEP 806.05(e) is therefore improper.

The applicants' main claims 1 and 59 closely track one another:

Claim 1: An adhesion promotion composition for enhancing adhesion between a copper conducting layer and a dielectric material during manufacture of a printed circuit board, the adhesion promotion composition comprising a corrosion inhibitor, an inorganic acid, an oxidizing agent, and an alcohol which is effective to increase copper-loading in the composition, and the adhesion promotion composition being initially substantially free of transition metals having a tendency to destabilize the oxidizing agent.

Claim 59: A process for enhancing adhesion between a copper conducting layer and a dielectric material during manufacture of a printed circuit board, the process comprising exposing the copper conducting layer to an adhesion promotion composition comprising a corrosion inhibitor, an inorganic acid, an oxidizing agent, and an alcohol which is effective to increase copper-loading in the composition, wherein the adhesion promotion composition is initially substantially free of transition metals having a tendency to destabilize the oxidizing agent, to thereby yield a microroughened copper surface.

Withdrawal of the restriction requirement is therefore also requested on the basis of the following instruction from MPEP 803:

"If the search and examination can be made without serious burden, the examiner must examine it on the merits, even if it includes claims to distinct or independent inventions."
(emphasis added)

In this regard, applicants respectfully ask the Office to consider the relative burdens on himself and the applicants, as well as the similar nature of these claims, as directed by MPEP 803. Claim 1 and claim 59 were intentionally drafted to closely mirror each other and to capture the same inventive concepts.

In order for a reliable search to be conducted for either the applicants' composition or method claims, both Class/subclass combinations will have to be searched. Accordingly, maintaining all claims in the application should not add more than a minimal burden.

The applicants further emphasize that the Office often examines both composition and method claims in the same application in situations such as this. Recently issued patents with claims directly analogous to applicants' claims include the following:

6,562,221 (May 2003)

PROCESS AND COMPOSITION FOR HIGH SPEED PLATING OF TIN AND TIN ALLOYS

Claim 1. A composition for electroplating tin or tin alloys onto a substrate said composition comprising..."

Claim 7. A process for electroplating tin or tin alloys onto a substrate comprising contacting the substrate..."

6,689,738 (Feb. 2004)

OXIDATION PROCESS AND COMPOSITION

Claim 1. Oxidation process wherein an oxidisable substance is reacted with..."

Claim 9. A composition for oxidizing substances, comprising..."

6,620,263 (Sept. 2003)

ZINC PHOSPHATE PROCESS AND COMPOSITION WITH REDUCED POLLUTION POTENTIAL

Claim 1. An aqueous liquid working composition for forming phosphate conversion coating on a metal surface..."

Claim 19. A process for forming a phosphate conversion coating on a metal substrate..."

6,638,370 (Oct. 2003)

PHOSPHATE CONVERSION COATING PROCESS AND COMPOSITION

Claim 1. An aqueous liquid composition of matter that will form a conversion coating by..."

Claim 6. A process for forming a conversion coating on a ferriferous substrate by..."

Claim 17. A process for bonding a ferriferous substrate..."

6,663,467 (Dec. 2003)

PROCESS AND COMPOSITION FOR ABRADING PRE-FINISHED SURFACES

Claim 1. An abrading composition for abrading surface coverings comprising..."

Claim 9. A process for abrading a wood floor surface comprising..."

These are not isolated instances, as the patent collection is replete with such patents. While this is not controlling on the Office in the present case, applicants respectfully request that it be taken into account when weighing i) the relative burdens, ii) the closely parallel nature of applicants' composition and very few method claims, and iii) the overlapping if not identical nature of the respective searches required.

The applicants respectfully submit that the burden of examining three additional claims having overlapping search fields cannot fairly be said to be "serious." In contrast, applicants would incur filing fees of about \$1000, issue fees of about \$1,400, and maintenance fees of about \$8,000 or more if required to prosecute and maintain a second application/patent, such fees being in addition to the similar fees to be incurred in this first application. This financial burden is exacerbated by the fact that extra claim fees of \$990 were paid in the present application.

In view of the foregoing, applicants respectfully ask the Office to withdraw the restriction requirement. Applicants affirm the prior election of Group I, if the restriction requirement is not withdrawn.

**II. REJECTION OF CLAIMS 2-25, 29, 31, 33-34, 41, 46-47 AND 51-58
UNDER 35 U.S.C. § 112, SECOND PARAGRAPH**

Reconsideration is requested of the rejection of claims 2-25, 29, 31, 33-34, 41, 46-47 and 51-58 under 35 U.S.C. § 112, second paragraph.

Claims 2-25, 29, 31, 33-34, 41 and 46-47 have been amended to include proper Markush terminology. Claim 51 has been amended to provide antecedent basis for "oxidizing agent" in claims 52 and 53. Applicants believe that claims 54 and 55 are proper under 35 U.S.C. § 112, and request reconsideration of the rejection of those claims. Applicants believe that claim 56 is proper under 35 U.S.C. § 112, due to the fact that antecedent basis exists as to "the oxidizing agent" in the second line of that claim. Claims 57 and 58 depend directly or indirectly from claim 56. All rejections made by the Office based on § 112 have been addressed. Accordingly, these rejections are now moot and should be withdrawn by the Office.

**III. FERRIER (5,869,130) DOES NOT ANTICIPATE CLAIMS 1, 10-17 AND
26-31 UNDER 35 U.S.C. § 102(B)**

Reconsideration is requested of the rejection of claims 1, 10-17 and 26-31 under 35 U.S.C. § 102(b) as being anticipated by Ferrier '130.

The Office states in the September 23, 2004 Office action that there are "[n]o significant differences...between the instant claims and the reference as the reference teaches a

composition that encompasses that which is instantly claimed." However, claim 1 recites the following requirement not disclosed or suggested in the reference:

an alcohol which is effective to increase copper-loading in the composition

This is an express requirement which cannot be ignored in assessing patentability:

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. (MPEP 2131) Emphasis added.

The Office refers to the section of Ferrier '130 extending from column 5, line 22+, as well as claims 1 and 5 and examples 6 and 8. Some of these are alcohols; but none is stated to be "an alcohol effective to increase copper-loading." Moreover, Ferrier's alcohols are so markedly different from the alcohols which applicants demonstrate to be "effective to increase copper-loading," that there is no sound technical basis to conclude Ferrier's alcohols might inherently have this characteristic.

In particular, the cited sections of Ferrier '130 describe that the adhesion-promoting compound disclosed by Ferrier may optionally also comprise a water soluble polymer. Some of these are alcohols, some are not (col. 5, lines 22-43):

- a water soluble homopolymer or copolymer of low molecular weight water soluble monomers
- a polymer of ethylene oxide
- an ethylene oxide-propylene oxide copolymer
- polyethylene glycols
- polypropylene glycols

- polyvinyl alcohols
- Carbowax 750
- Carbowax MPEG 2000
- BASF Pluronic products

None of these specific compounds nor the class generally are stated to increase copper-loading. Rather, Ferrier states a different purpose:

the proper combination of halide and water soluble polymer provide the best possible results in creating improved bonding and reliability between metal surfaces and polymeric bonding materials. (Column 5, lines 40-44)

Accordingly, Ferrier '130 does not disclose or suggest the express requirement of claim 1 of "an alcohol effective to increase copper-loading in the composition."

The Office appears to have taken the position that there is anticipation because Ferrier '130 discloses alcohols generally, and such alcohols must *inherently* be alcohols "which are effective to increase copper-loading in the composition." Applicants respectfully request reconsideration and withdrawal of any rejection based on inherency. To establish inherency, the Office must establish by fact or technical reasoning why it is necessary that the Ferrier '130 compositions increase copper-loading:

Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient. (MPEP 2112 (quoting In re Robertson, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999))) (emphasis added)

In relying on the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly

inherent characteristic necessarily flows from the teaching of the applied prior art. (MPEP 2112 (citing Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990))) (emphasis added)

The Office has not demonstrated the inherency of this requirement in the Ferrier '130 compositions. No basis in fact or technical reasoning has been asserted as to why increased copper-loading would necessarily flow from any alcohol, generally, and from Ferrier '130's selected alcohols, specifically. In fact, one is inclined to conclude to the contrary because:

1) Ferrier states that the function of the water soluble polymers with halide in the proper combination is to improve bonding and reliability, and is wholly silent as to any function related to copper-loading; and

2) Ferrier's preferred water soluble polymers are, in contrast to applicants' preferred alcohols, extremely large compounds: the molecular weights of preferred compounds Carbowax and Carbowax MPEG 2000 are 750 and 1800-2200, respectively. Their behavior and function in a complex adhesion-promoting composition cannot be reliably predicted from data regarding applicants' wholly distinct oligomeric alcohols.

Claim 1 is therefore patentable over the cited reference because a) the reference does not disclose the express requirement of "alcohols effective to increase copper-loading in the composition," and b) there is no technical basis from which to conclude the reference's large water soluble polymers would inherently be effective to increase copper-loading. Claims 10-17 and 26-31 depend directly or indirectly from claim 1 and are

patentable for the same reasons as claim 1, as well as for the additional elements they require.

With specific regard to claims 10 and 11, they are further patentable because they expressly require that the alcohol be a "trihydric alcohol." A "trihydric alcohol" is an alcohol that has three hydroxyl groups. Applicants understand that it may be the Office's position that the use of a "trihydric alcohol" is anticipated by the reference in Ferrier '130 directed to "water soluble polymers," generally, or by the following specific water soluble polymers specifically disclosed by Ferrier in Column 5:

- a water soluble homopolymer or copolymer of low molecular weight water soluble monomers
- a polymer of ethylene oxide
- an ethylene oxide-propylene oxide copolymer
- polyethylene glycols
- polypropylene glycols
- polyvinyl alcohols
- Carbowax 750
- Carbowax MPEG 2000
- BASF Pluronic products

However, even if polymer does encompass trihydric, it at most refers to a genus encompassing trihydric, tetrahydric, pentahydric, etc. of which trihydric is a subgenus. This does not constitute anticipation unless certain additional requirements are met (MPEP 2131.02):

A GENERIC CHEMICAL FORMULA WILL ANTICIPATE A CLAIMED SPECIES COVERED BY THE FORMULA WHEN THE SPECIES CAN BE "AT ONCE ENVISAGED" FROM THE FORMULA.

When the compound is not specifically named, but instead it is necessary to select portions of teachings within a reference and combine them...anticipation can only be found

if the classes...are sufficiently limited or well delineated.

[...]

One may look to the preferred embodiments to determine which compounds can be anticipated. (citing In re Petering, 301 F.2d 676, 133 USPQ 275 (CCPA 1962))

It cannot be fairly held that applicants' claimed trihydric subgenus of claims 10 and 11 can be "at once envisaged" by looking at Ferrier '130.

First, Ferrier '130 describes the use of water soluble polymers, whereas applicants describe the use of trihydric alcohols. These compounds have different definitions and properties. A polymer is defined by IUPAC as follows:

A molecule of high relative molecular mass, the structure of which essentially comprises the multiple repetition of units derived, actually or conceptually, from molecules of low relative molecular mass.

Note 1. In many cases, especially for synthetic polymers, a molecule can be regarded as having high relative molecular mass if the addition or removal of one or a few of the units has a negligible effect on the molecular properties.

<http://www.iupac.org/publications/pac/1996/pdf/6812x2287.pdf>

A trihydric alcohol, rather, is an alcohol that has three hydroxyl groups. Ferrier, therefore, is describing one class of compounds, while applicants are requiring another. Accordingly, Ferrier '130 does not anticipate the requirement of applicants' claims 10 and 11 in *ipsis verbis*.

Second, based on Ferrier's specification and examples, it is evident he was only concerned with polymers having relatively high molecular weights and/or a relatively large number of hydroxyl groups. Not a single one of Ferrier's disclosed species appears to be a trihydric alcohol. For example, among

Ferrier's preferred water soluble polymers is a polymer of ethylene oxide and an ethylene oxide-propylene oxide copolymer. These water soluble polymers are clearly not trihydric alcohols, much less even alcohols.

Moreover, Ferrier's additionally preferred water soluble polymers include polyethylene glycols, polypropylene glycols, or polyvinyl alcohols. Specifically, Ferrier prefers Dow Chemicals' polyethylene glycols, Carbowax 750 and Carbowax MPEG 2000. Polyethylene glycol has the general chemical formula $\text{H}-(\text{OCH}_2\text{CH}_2)_n-\text{OH}$, wherein n is a whole number greater than 1. Carbowax 750 has an average molecular weight of 750, which means that it has a formula of $\text{H}-(\text{OCH}_2\text{CH}_2)_n-\text{OH}$, wherein n is 16 or 17. This corresponds to a compound having 17 or 18 hydroxyl groups, at least five times more than the 3 hydroxyl groups required by claims 10 and 11 of applicants' invention. Even the lowest molecular weight Carbowax on the market, Carbowax 200, must have at least 5 hydroxyl groups.

While Ferrier '130 may disclose an overlapping class of compounds, namely alcohols, MPEP 2131.02 requires one of ordinary skill in the art to "at once envisage" the claimed subject matter for it to be anticipated in these situations. Additionally, according to In re Petering, Ferrier's emphasis on high molecular weight polymers in both the specification and the examples, the absence of discussion of other alcohols, and the clear differences in the number of hydroxyl groups in the Ferrier polymers versus the number of hydroxyl groups in applicants' alcohols are such that applicants' claimed compounds are not disclosed, and certainly cannot be "at once envisaged" by looking to Ferrier '130.

Based on the foregoing, claims 10 and 11 are specifically patentable over Ferrier '130.

With specific regard to claims 12 and 13, they are further patentable because they expressly require that the alcohol be an "oligomeric trihydric alcohol." Applicants understand that it may be the Office's position that the use of an "oligomeric trihydric alcohol" is anticipated by the reference in Ferrier '130 directed to "water soluble polymers," generally, or by the following specific water soluble polymers specifically disclosed by Ferrier in column 5:

- a water soluble homopolymer or copolymer of low molecular weight water soluble monomers
- a polymer of ethylene oxide
- an ethylene oxide-propylene oxide copolymer
- polyethylene glycols
- polypropylene glycols
- polyvinyl alcohols
- Carbowax 750
- Carbowax MPEG 2000
- BASF Pluronic products

It cannot be fairly held that applicants' claimed oligomeric trihydric subgenus of claims 12 and 13 can be "at once envisaged" by looking at Ferrier '130.

First, Ferrier '130 describes the use of water soluble polymers, whereas applicants describe the use of oligomers. These compounds have different definitions and properties, as illustrated in applicants' specification on page 11, lines 22-31. A polymer is characterized as having a high relative molecular mass. An oligomer, in contrast, is defined by IUPAC as

A molecule of intermediate relative molecular mass, the structure of which essentially comprises a small plurality of units derived, actually or conceptually, from molecules of lower relative molecular mass.

Note 1. A molecule is regarded as having intermediate relative molecular mass if it has properties which do vary significantly with the removal of one or a few of the units.

<http://www.iupac.org/publications/pac/1996/pdf/6812x2287.pdf>

This distinction is underscored on page 12 of applicants' specification in describing one of their preferred oligomers:

This triethylene glycol is an oligomer in that it is a molecule of intermediate relative molecular mass with a structure comprising a small number of units derived from molecules of lower relative molecular mass. This is in contrast to a polymer, which has a high relative molecular mass. This triethylene glycol is also oligomeric in that its properties vary significantly with removal of one of its units; as opposed to polymeric compounds, with which removal of one or a few units has a relatively negligible effect on molecular properties.

Ferrier '130, therefore, is describing one class of compounds, while applicants are requiring another. Accordingly, Ferrier '130 does not anticipate the requirement of applicants' claims 12 and 13 in *ipsis verbis*.

Second, based on Ferrier's specification and examples, it is evident he was only concerned with polymers having relatively high molecular weights and/or a relatively large number of hydroxyl groups. Not a single one of Ferrier's disclosed species appears to be an oligomeric trihydric alcohol. For example, among Ferrier's preferred water soluble polymers is a polymer of ethylene oxide and an ethylene oxide-propylene oxide

copolymer. These water soluble polymers are clearly not oligomeric trihydric alcohols, much less even alcohols.

Moreover, Ferrier's additionally preferred water soluble polymers include polyethylene glycols, polypropylene glycols, or polyvinyl alcohols. Specifically, Ferrier prefers Dow Chemicals' polyethylene glycols, Carbowax 750 and Carbowax MPEG 2000. Polyethylene glycol has the general chemical formula $H-(OCH_2CH_2)_n-OH$, wherein n is a whole number greater than 1. Carbowax 750 has an average molecular weight of 750, which means that it has a formula of $H-(OCH_2CH_2)_n-OH$, wherein n is 16 or 17. This corresponds to a compound having 17 or 18 hydroxyl groups, at least five times more than the 3 hydroxyl groups required by claims 12 and 13 of applicants' invention. Even the lowest molecular weight Carbowax on the market, Carbowax 200, must have at least 5 hydroxyl groups.

While Ferrier '130 may disclose an overlapping class of compounds, namely alcohols, MPEP 2131.02 requires one of ordinary skill in the art to "at once envisage" the claimed subject matter for it to be anticipated in these situations. Additionally, according to In re Petering, Ferrier's emphasis on high molecular weight polymers in both the specification and the examples, the absence of discussion of other alcohols, and the clear differences in the number of hydroxyl groups in the Ferrier polymers versus the number of hydroxyl groups in applicants' alcohols are such that applicants' claimed compounds are not disclosed, and certainly cannot be "at once envisaged" by looking to Ferrier '130.

Based on the foregoing, claims 12 and 13 are specifically patentable over Ferrier '130.

With specific regard to claims 14-15, 16-17, 26-27, 29 and 31, they are all further patentable over Ferrier '130 based on the foregoing arguments. Claims 14-15, 16-17, 26-27, 29 and 31 each narrow the "alcohol effective to increase copper-loading in the composition" from claim 1 to a specific species of alcohol:

Claims 14-15:

"wherein the alcohol is selected from the group consisting of primary alcohols"

Claims 16-17:

"wherein the alcohol is selected from the group consisting of oligomeric primary alcohols"

Claims 26-27:

"wherein the alcohol is triethylene glycol"

Claims 29 and 31:

"wherein the alcohol is selected from the group consisting of monohydric alcohols, dihydric alcohols, trihydric alcohols, primary alcohols, secondary alcohols, and tertiary alcohols"

The above arguments made in relation to "trihydric alcohols" and "oligomeric trihydric alcohols" similarly apply to claims 14-15, 16-17, 26-27, 29 and 31. Not one of the specific alcohols in Ferrier's list in column 5, satisfies the claim requirements:

- a primary alcohol (claims 14 and 15)
- an oligomeric primary alcohol (claims 16 and 17)
- triethylene glycol (claims 26 and 27)
- a monohydric, dihydric, trihydric, primary, secondary, or tertiary alcohol (claims 29 and 31)

Moreover, none of these specifically required characteristics is stated or suggested by Ferrier.

The lack of anticipation is underscored by the fact that the "water soluble polymers" disclosed in Ferrier '130 have at least five times more hydroxyl groups than the exemplary suitable monohydric, dihydric, and trihydric alcohols disclosed in applicants' specification on page 11, lines 1-8:

<u>Exemplary mono-, di-, or trihydric alcohol</u>	<u>Hydroxyl Groups</u>
- triethylene glycol	2
- ethylene glycol	2
- diethylene glycol	2
- diethylene glycol methyl ether	1
- triethylene glycol monomethyl ether	1
- propylene glycol	2
- dipropylene glycol	2
- glycerol	3
- tetrahydrofurfural alcohol	1
- 1,4-butanediol	2
- 2-butene-1,4-diol (unsaturated)	2
- 1,6-hexanediol	2
- methanol	1
- isopropanol	1

While Ferrier '130 may disclose an overlapping class of compounds, namely alcohols, MPEP 2131.02 requires one of ordinary skill in the art to "at once envisage" the claimed subject matter for it to be anticipated in these situations. Additionally, according to In re Petering, Ferrier's emphasis on high molecular weight polymers in both the specification and the examples, the absence of discussion of other alcohols, and the clear differences in the number of hydroxyl groups in the Ferrier polymers versus the number of hydroxyl groups in

applicants' alcohols are such that applicants' claimed compounds are not disclosed, and certainly cannot be "at once envisaged" by looking to Ferrier '130. Claims 14-15, 16-17, 26-27, 29 and 31 are therefore also specifically patentable over Ferrier '130.

With respect to all of these claims 1, 10-17, and 26-31, it is also significant to consider the maxim "that which infringes, if later, anticipates, if earlier." No adhesion-promoting compositions containing one of Ferrier's specific compounds as the alcohol would infringe any of applicants' claims discussed above.

In view of the foregoing, applicants request withdrawal of the rejection of these claims over Ferrier '130.

IV. FERRIER ET AL. (6,020,029) DOES NOT ANTICIPATE CLAIMS 1, 10-17 AND 26-31 UNDER 35 U.S.C. § 102(B)

Reconsideration is requested of the rejection of claims 1, 10-17 and 26-31 under 35 U.S.C. § 102(b) as being anticipated by Ferrier et al. '029.

Ferrier et al. '029 was cited under § 102(b) by the Office for the same reason as Ferrier '130. Ferrier et al. '029 is related to Ferrier '130, and they have nearly identical disclosures and examples. Thus, in view of the above arguments relating to Ferrier '130, applicants respectfully submit that claims 1, 10-17, and 26-31 are patentable over Ferrier et al. '029 as well. Ferrier '029 similarly fails to disclose or suggest an alcohol which increases copper loading, and there is no technical basis upon which to conclude this characteristic is inherent in any of the polymers of Ferrier '029. And with specific regard to claims 10-17 and 26-27, 29 and 31, Ferrier '029 similarly fails to disclose or suggest, expressly or

inherently, the further requirements ("trihydric," "oligomeric" etc.) in these claims.

V. FERRIER (6,146,701) DOES NOT ANTICIPATE CLAIMS 1, 10-17 AND 26-31 UNDER 35 U.S.C. § 102(B)

Reconsideration is requested of the rejection of claims 1, 10-17 and 26-31 under 35 U.S.C. § 102(b) as being anticipated by Ferrier '701.

Ferrier '701 was cited under § 102(b) by the Office for the same reason as Ferrier '130. Ferrier '701 is related to Ferrier '130 and Ferrier et al. '029, and they have nearly identical disclosures and examples. Thus, in view of the above arguments made by applicants in relation to the § 102(b) rejection based on Ferrier '130, applicants respectfully submit that claims 1, 10-17, and 26-31 are patentable over Ferrier '701 as well.

With specific regard to claims 10-17 and 26-27, 29 and 31, they are also further patentable in view of the above arguments made by applicants in relation to the § 102(b) rejection based on Ferrier '130.

VI. PRICE ET AL. (5,800,859) DOES NOT RENDER CLAIMS 45-54 UNPATENTABLE UNDER 35 U.S.C. § 103(A)

Reconsideration is requested of the rejection of claims 45-54 under 35 U.S.C. § 103(a) over Price et al. '859.

Price et al. describe an adhesion promotion material comprising hydrogen peroxide, an inorganic acid, one or more corrosion inhibitors, and a surfactant, the surfactant preferably being a cationic surfactant. Preferred surfactants by Price et al. include quaternary ammonium surfactants. Optionally, the composition may also include an additional component comprising a stabilizing agent.

The applicants' claims 45 and 51 expressly require an anionic (claim 45) or nonionic (claim 51) surfactant.

According to MPEP 2143:

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the reference itself or in the knowledge generally available to one skilled in the art, to modify the reference. Second, there must be a reasonable expectation of success. Finally, the prior art reference must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must be both found in the prior art, and not based on the applicant's disclosure.

First, Price et al. does not provide any motivation or suggestion to modify the teachings therein to arrive at every claimed requirement of applicants' invention. Specifically, Applicants' claims 45 and 51 require the use of an anionic or nonionic surfactant. Price et al. describes the use of cationic surfactants. No mention is made in Price et al. of any anionic or nonionic surfactants. Moreover, Examples 1-8 in Price et al. only use the quaternary amines isodecyloxypropyl dihydroxyethyl methyl ammonium chloride and isotridecyloxypropyl dihydroxyethyl methyl ammonium chloride and the ethoxylated amine bis-(2-hydroxyethyl) isodecyloxypropylamine. Since the surfactants in Price et al. are all cationic surfactants, and no mention is made of any surfactants other than cationic surfactants in the specification or examples, it cannot be fairly stated that there is a motivation or suggestion in Price et al. to modify the reference to provide a composition having a nonionic or anionic surfactant.

Not only do Price et al. fail to provide a motivation or suggestion to modify the teachings therein to arrive at each and

every claimed requirement of applicants' invention, they also fail to teach or suggest all of the claimed requirements of applicants' invention. Their surfactants are all cationic surfactants, and no mention is made of any other surfactant other than cationic surfactants.

Moreover, the presence of unexpected properties of the anionic and nonionic surfactants used in applicants' invention render it further nonobvious. According to MPEP 716.02(a), "the presence of a property not possessed by the prior art is evidence of nonobviousness." The applicants noted several surprising and unexpected results as a result of using anionic and nonionic surfactants in their adhesion promotion composition. For example, where the surfactant was a sulfonated anionic surfactant, the applicants surprisingly and unexpectedly discovered that "in addition to surface wetting, this surfactant helps to stabilize the H_2O_2 ." (see Specification, page 8, lines 7-10). This unexpected result is particularly relevant, because Price et al. describe optional additional components (other than cationic surfactants) that may be added to the composition which comprise stabilizing agents for the hydrogen peroxide (see Price et al., column 5, lines 44-52). The applicants also discovered that "the addition of a sulfated anionic surfactant surprisingly permit[ted] the acidity level of the composition to be raised, without the expected detrimental effect of lightening the coating," which thus increased copper-loading. (see Specification, page 9, lines 15-20). Finally, applicants discovered that the use of a nonionic surfactant results in "the unexpected additional benefit of improving peel strength." (see Specification, page 9, line 29 to page 10, line 1).

Based on the foregoing, claims 45 and 51 are patentable over Price et al. '859. Claims 46-50 and 52-54 depend directly

or indirectly from claims 45 and 51 and are patentable for the same reasons as claims 45 and 51, as well as for the additional elements they require.

VII. FERRIER (6,162,503) DOES NOT RENDER CLAIMS 1, 10-17 AND 26-31 UNPATENTABLE UNDER 35 U.S.C. § 103(A)

Reconsideration is requested of the rejection of claims 1, 10-17 and 26-31 under 35 U.S.C. § 103(a) over Ferrier '503.

On page 8 of the Office action dated September 23, 2004, the Office refers to the section of Ferrier '503 extending from column 6, lines 35+. These sections describe that the adhesion-promoting compound disclosed by Ferrier may optionally also comprise a water soluble polymer. Preferred polymers described by Ferrier include a polymer of ethylene oxide, ethylene oxide-propylene oxide copolymer, polyethylene glycols, polypropylene glycols or polyvinyl alcohols. More preferred polymers by Ferrier include, for example, Carbowax 750, Carbowax MPEG 2000, and products under the Pluronic tradename.

Claim 1 of applicants' invention is directed to an adhesion promotion composition comprising "an alcohol which is effective to increase copper-loading in the composition." This requirement is significant because the addition of an alcohol in claim 1 of applicants' invention marks a substantial improvement over the prior art in terms of tolerance for copper build-up without sludge formation.

According to MPEP 2143:

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the reference itself or in the knowledge generally available to one skilled in the art, to modify the reference. Second, there must be a reasonable expectation of success. Finally, the prior art reference

must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must be both found in the prior art, and not based on the applicant's disclosure.

The Office has not, and cannot meet its burden under the first and/or third criteria above, as there is no disclosure in Ferrier '503 of "an alcohol which increases copper-loading in the composition," nor is there any motivation or suggestion to modify Ferrier '503 to include such an alcohol. Ferrier '503 only describes an adhesion-promoting composition containing "water soluble polymers." No mention is made in Ferrier '503 of any copper-loading properties of the water soluble polymers described therein. Accordingly, the reference cannot fairly be held to teach or suggest each and every claimed requirement of the applicants' invention.

While Ferrier fails to disclose "alcohols which increase copper-loading in the composition" in so many words, this requirement also cannot fairly be deemed to be satisfied by inherency. To establish inherency, the Office must establish by fact or technical reasoning why it is necessary that the Ferrier '503 alcohols increase copper-loading:

Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient. (MPEP 2112 (quoting In re Robertson, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999))) (emphasis added)

In relying on the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teaching of the applied prior art. (MPEP 2112 (citing Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990))) (emphasis added)

The Office has not demonstrated the inherency of this requirement in the Ferrier '503 compositions. No basis in fact or technical reasoning has been asserted as to why increased copper-loading would necessarily flow from any alcohol, generally, and from Ferrier's selected alcohols, specifically. In fact, one is inclined to conclude to the contrary because:

1) Ferrier states that the function of the water soluble polymers with halide in the proper combination is to improve bonding and reliability, and is wholly silent as to any function related to copper-loading; and

2) Ferrier's preferred water soluble polymers are, in contrast to applicants' preferred alcohols, extremely large compounds: the molecular weights of preferred compounds Carbowax and Carbowax MPEG 2000 are 750 and 1800-2200, respectively. Their behavior and function in a complex adhesion-promoting composition cannot be reliably predicted from data regarding applicants' wholly distinct oligomeric alcohols.

Based on the foregoing, claim 1 is patentable over Ferrier '503. Claims 10-17 and 26-31 depend directly or indirectly from claim 1 and are patentable for the same reasons as claim 1, as well as for the additional elements they require.

With specific regard to claims 10 and 11, they are further patentable because they expressly require that the alcohol be a "trihydric alcohol." A "trihydric alcohol" is an alcohol that has three hydroxyl groups. The applicants understand that it may be the Office's position that the use of a "trihydric alcohol" is obvious in light of the reference in Ferrier '503 directed to "water soluble polymers," generally, or by the

following polymers specifically disclosed by Ferrier in
column 6:

- a water soluble homopolymer or copolymer of
low molecular weight water soluble monomers
- a polymer of ethylene oxide
- an ethylene oxide-propylene oxide copolymer
- polyethylene glycols
- polypropylene glycols
- polyvinyl alcohols
- Carbowax 750
- Carbowax MPEG 2000
- BASF Pluronic products

However, there is no indication that any of these polymers is a trihydric alcohol. Moreover, even if these terms do encompass trihydric, they at most refer to a *genus* encompassing trihydric, tetrahydric, pentahydric, etc. of which trihydric is a subgenus. The law is clear, however, in MPEP 2144.08, that simply disclosing a genus such as "polymeric alcohol" does not render all subgenuses such as "trihydric alcohol" obvious:

[t]he fact that a claimed species or subgenus is encompassed by a prior art genus is not sufficient by itself to establish a *prima facie* case of obviousness. (citing In re Baird, 16 F.3d 380, 382, 29 USPQ2d 1550, 1552 (Fed. Cir. 1994) ("The fact that a claimed compound may be encompassed by a disclosed generic formula does not by itself render that compound obvious."))

According to MPEP 2144.08(II)(A), in determining whether there is obviousness in such a situation, the Office should:

- compare the [disclosed prior art genus] to the claimed species or subgenus to determine the differences [and]

- determine whether one of ordinary skill in the relevant art would have been motivated to make the claimed invention as a whole, i.e., to select the claimed species or subgenus from the disclosed prior art genus.

This includes, among other things:

- (a) Considering the size of the genus;
- (b) Considering the express teachings; and
- (c) Considering the teachings of structural similarity.

Here, upon comparing the genus in the specification and examples of Ferrier '503 directed to "water soluble polymers" to applicants' trihydric alcohols, it is clear that one of ordinary skill in the art would not be motivated to select applicants' species from Ferrier's disclosure. First, it is evident Ferrier was only concerned with water soluble polymers having relatively high molecular weights and/or a relatively large number of hydroxyl groups, generally. Not a single one of Ferrier's disclosed species appears to be a trihydric alcohol. For example, among Ferrier's preferred water soluble polymers is a polymer of ethylene oxide and an ethylene oxide-propylene oxide copolymer. These water soluble polymers are clearly not trihydric alcohols, much less even alcohols. As such, Ferrier's genus includes not only alcohols, but other compounds as well, making it unlikely that one of ordinary skill on the relevant art would be motivated to select applicants' trihydric alcohols.

Moreover, Ferrier's additionally preferred water soluble polymers include polyethylene glycols, propylene glycols, or polyvinyl alcohols. Specifically, Ferrier prefers Dow Chemicals' polyethylene glycols, Carbowax 750 and Carbowax MPEG

2000. Polyethylene glycol has the general chemical formula $H-(OCH_2CH_2)_n-OH$, wherein n is a whole number greater than 1. Carbowax 750 has an average molecular weight of 750, which means that it has a formula of $H-(OCH_2CH_2)_n-OH$, wherein n is 16 or 17. This corresponds to a compound having 17 or 18 hydroxyl groups, at least five times more than the 3 hydroxyl groups required by claims 12 and 13 of applicants' invention. Even the lowest molecular weight Carbowax on the market, Carbowax 200, must have at least 5 hydroxyl groups. Therefore, considering the express teachings of Ferrier and the fact that the compounds in his genus are so structurally dissimilar, it is unlikely that one of ordinary skill in the relevant art would be motivated to select the applicants' trihydric alcohols.

While Ferrier '503 may disclose an overlapping class of compounds, namely alcohols, MPEP 2144.08 additionally states that the Office must find some motivation in the art to select an alcohol in applicants' trihydric alcohol subgenus; and in this analysis:

consider any teaching or suggestion in the reference of a preferred species or subgenus that is significantly different in structure from the claimed species or subgenus. Such a teaching may weigh against selecting the claimed species or subgenus and thus against a determination of obviousness. (emphasis added)

Clearly, Ferrier's disclosure of water soluble polymers having such a large number of hydroxyl groups are so "significantly different" as to "weigh against" the obviousness of applicants' claimed invention.

Based on the foregoing, claims 10 and 11 are further patentable over Ferrier (6,162,503).

With specific regard to claims 12 and 13, they are further patentable because they expressly require that the alcohol be an "oligomeric trihydric alcohol." While Ferrier's general class of compounds "water soluble polymers" might be deemed to encompass "oligomeric trihydric alcohol" according to some definitions of the word "polymer," one would be motivated by Ferrier's specific preferences to select something much different from an oligomeric trihydric alcohol:

- a water soluble homopolymer or copolymer of low molecular weight water soluble monomers
- a polymer of ethylene oxide
- an ethylene oxide-propylene oxide copolymer
- polyethylene glycols
- polypropylene glycols
- polyvinyl alcohols
- Carbowax 750
- Carbowax MPEG 2000
- BASF Pluronic products

First, Ferrier '503 describes the use of water soluble polymers, whereas applicants' claims 12 and 13 require the use of oligomers. These terms describe wholly distinct classes of compounds which do not overlap, or overlap marginally at most:

OLIGOMER: A molecule of intermediate relative molecular mass, the structure of which essentially comprises a small plurality of units derived, actually or conceptually, from molecules of lower relative molecular mass.

Note 1. A molecule is regarded as having intermediate relative molecular mass if it has properties which do vary significantly with the removal of one or a few of the units.

<http://www.iupac.org/publications/pac/1996/pdf/6812x2287.pdf>

POLYMER: A molecule of high relative molecular mass, the structure of which essentially comprises the multiple repetition of units derived, actually or conceptually, from molecules of low relative molecular mass.

Note 1. In many cases, especially for synthetic polymers, a molecule can be regarded as having high relative molecular mass if the addition or removal of one or a few of the units has a negligible effect on the molecular properties.

<http://www.iupac.org/publications/pac/1996/pdf/6812x2287.pdf>

This distinction is underscored on page 12 of applicants' specification in describing one of their preferred oligomers:

This triethylene glycol is an oligomer in that it is a molecule of intermediate relative molecular mass with a structure comprising a small number of units derived from molecules of lower relative molecular mass. This is in contrast to a polymer, which has a high relative molecular mass. This triethylene glycol is also oligomeric in that its properties vary significantly with removal of one of its units; as opposed to polymeric compounds, with which removal of one or a few units has a relatively negligible effect on molecular properties.

Therefore, considering the express teachings of Ferrier and the fact that his compounds are so structurally dissimilar in that they are high molecular weight compounds and/or have a large number of hydroxyl groups, it is unlikely that one of ordinary skill on the relevant art would be motivated to select applicants' species.

While Ferrier '503 may disclose an overlapping class of compounds, namely alcohols, MPEP 2144.08 additionally states that the Office must find some motivation in the art to select an alcohol in applicants' trihydric alcohol subgenus; and in this analysis:

consider any teaching or suggestion in the reference of a preferred species or subgenus that is significantly different in structure from the claimed species or subgenus. Such a teaching may weigh against selecting the claimed species or subgenus and thus against a determination of obviousness. (emphasis added)

Clearly, Ferrier's disclosure of water soluble polymers having such a large number of hydroxyl groups are so "significantly different" as to "weigh against" the obviousness of applicants' claimed invention.

Based on the foregoing, claims 12 and 13 are further patentable over Ferrier '503.

With specific regard to claims 14-15, 16-17, 26-27, 29 and 31, they are additionally patentable over Ferrier '503 in view of the additional requirements they recite:

Claims 14-15:

"wherein the alcohol is selected from the group consisting of primary alcohols"

Claims 16-17:

"wherein the alcohol is selected from the group consisting of oligomeric primary alcohols"

Claims 26-27:

"wherein the alcohol is triethylene glycol"

Claims 29 and 31:

"wherein the alcohol is selected from the group consisting of monohydric alcohols, dihydric alcohols, trihydric alcohols, primary alcohols, secondary alcohols, and tertiary alcohols"

The above arguments made in relation to "trihydric alcohols" and "oligomeric trihydric alcohols" similarly apply to these claims. In fact, the preferred "water soluble polymers" disclosed in Ferrier '503 have at least five times more hydroxyl groups than the exemplary suitable monohydric, dihydric, and

trihydric alcohols disclosed in applicants' specification on
page 11, lines 1-8:

<u>Exemplary mono-, di-, or trihydric alcohol</u>	<u>Hydroxyl Groups</u>
- triethylene glycol	2
- ethylene glycol	2
- diethylene glycol	2
- diethylene glycol methyl ether	1
- triethylene glycol monomethyl ether	1
- propylene glycol	2
- dipropylene glycol	2
- glycerol	3
- tetrahydrofurfural alcohol	1
- 1,4-butanediol	2
- 2-butene-1,4-diol (unsaturated)	2
- 1,6-hexanediol	2
- methanol	1
- isopropanol	1

While Ferrier '503 may disclose an overlapping class of
compounds, namely alcohols, MPEP 2144.08 additionally states
that the Office must find some motivation in the art to select
an alcohol in applicants' trihydric alcohol subgenus; and in
this analysis:

consider any teaching or suggestion in the reference
of a preferred species or subgenus that is
significantly different in structure from the claimed
species or subgenus. Such a teaching may weigh
against selecting the claimed species or subgenus and
thus against a determination of obviousness. (emphasis
added)

Ferrier's disclosure of water soluble polymers having such a
large number of hydroxyl groups is so "significantly different"

as to "weigh against" the obviousness of applicants' claimed invention.

Based on the foregoing, claims 14-15, 16-17, 26-27, 29 and 31 are also further patentable over Ferrier '503.

VIII. FERRIER (6,383,272) DOES NOT RENDER CLAIMS 1, 10-17 AND 26-31 UNPATENTABLE UNDER 35 U.S.C. § 103(A)

Reconsideration is requested of the rejection of claims 1, 10-17 and 26-31 under 35 U.S.C. § 103(a) over Ferrier '272.

Ferrier '272 was cited under § 103(a) by the Office for the same reason as Ferrier '503. Ferrier '272 is related to Ferrier '503, and they have nearly identical disclosures and examples. Thus, in view of the above arguments made by applicants in relation to the § 103(a) rejection based on Ferrier '503, applicants respectfully submit that claims 1, 10-17, and 26-31 are patentable over Ferrier '272 as well.

With specific regard to claims 10-17, 26-27, 29 and 31, they are also further patentable in view of the above arguments made by the applicants in relation to the § 103(a) rejection based on Ferrier '503.

IX. FERRIER (6,419,784) DOES NOT RENDER CLAIMS 1, 10-17 AND 26-31 UNPATENTABLE UNDER 35 U.S.C. § 103(A)

Reconsideration is requested of the rejection of claims 1, 10-17 and 26-31 under 35 U.S.C. § 103(a) over Ferrier '784.

Ferrier '784 was cited under § 103(a) by the Office for the same reason as Ferrier '503. Ferrier '784 is related to Ferrier '503, and they have nearly identical disclosures and examples. Thus, in view of the above arguments made by the applicants in relation to the § 103(a) rejection based on Ferrier '503,

applicants respectfully submit that claims 1, 10-17, and 26-31 are patentable over Ferrier '784 as well.

With specific regard to claims 10-17, 26-27, 29 and 31, they are also further patentable in view of the above arguments made by the applicants in relation to the § 103(a) rejection based on Ferrier '503.

X. FERRIER (6,503,566) DOES NOT RENDER CLAIMS 1, 10-17 AND 26-31 UNPATENTABLE UNDER 35 U.S.C. § 103(A)

Reconsideration is requested of the rejection of claims 1, 10-17 and 26-31 under 35 U.S.C. § 103(a) over Ferrier '566.

Ferrier '566 was cited under § 103(a) by the Office for the same reason as Ferrier '503. Ferrier '566 is related to Ferrier '503, and they have nearly identical disclosures and examples. Thus, in view of the above arguments made by the applicants in relation to the § 103(a) rejection based on Ferrier '503, applicants respectfully submit that claims 1, 10-17, and 26-31 are patentable over Ferrier '566 as well.

With specific regard to claims 10-17, 26-27, 29 and 31, they are also further patentable in view of the above arguments made by the applicants in relation to the § 103(a) rejection based on Ferrier '503.

XI. FERRIER (6,554,948) DOES NOT RENDER CLAIMS 1, 10-17 AND 26-31 UNPATENTABLE UNDER 35 U.S.C. § 103(A)

Reconsideration is requested of the rejection of claims 1, 10-17 and 26-31 under 35 U.S.C. § 103(a) over Ferrier '948.

Ferrier '948 was cited under § 103(a) by the Office for the same reason as Ferrier '503. Ferrier '948 is related to Ferrier '503, and they have nearly identical disclosures and examples. Thus, in view of the above arguments made by the applicants in

relation to the § 103(a) rejection based on Ferrier '503, applicants respectfully submit that claims 1, 10-17, and 26-31 are patentable over Ferrier '948 as well.

With specific regard to claims 10-17, 26-27, 29 and 31, they are also further patentable in view of the above arguments made by the applicants in relation to the § 103(a) rejection based on Ferrier '503.

XII. MONTANO ET AL. (6,752,878) DOES NOT RENDER CLAIMS 1, 10-17, 26-43 AND 55-58 UNPATENTABLE UNDER 35 U.S.C. § 103(A)

Reconsideration is requested of the rejection of claims 1, 10-17 and 26-43 and 55-58 under 35 U.S.C. § 103(a) over Montano et al. '878.

Montano et al. '878 was cited under § 103(a) by the Office for the same reason as Ferrier '503. The section cited in Montano et al. '878 (column 8, lines 63+) is nearly identical to the section cited in Ferrier '503. The two sections provide the same preferred water soluble polymers and concentrations thereof. Thus, in view of the above arguments made by the applicants in relation to the § 103(a) rejection based on Ferrier '503, applicants respectfully submit that claims 1, 10-17, 26-43 and 55-58 are patentable over Montano et al. '878 as well.

With specific regard to claims 10-17, 26-27, 29 and 31, they are also further patentable in view of the above arguments made by the applicants in relation to the § 103(a) rejection based on Ferrier '503.

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CONCLUSION

In view of the foregoing, applicants respectfully request a
Notice of Allowance for all pending claims 1-61.

Respectfully submitted,



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